

A NEW SPECIES OF *CIRROSPILUS* WESTWOOD
(HYMENOPTERA: EULOPHIDAE) FROM SOUTHEASTERN ARIZONA

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Abstract.—*Cirrospilus infuscatus*, n. sp. (Hymenoptera: Eulophidae), is described from southeastern Arizona. This species was reared from *Tischeria bifurcata* Braun (Lepidoptera: Tischeriidae) on *Ceanothus fendleri* A. Gray (Rhamnaceae).

Key Words: Hymenoptera, Eulophidae, *Cirrospilus*, taxonomy, Chalcidoidea

Species of the cosmopolitan genus *Cirrospilus* Westwood parasitize cryptically-feeding insects, most often leaf-rollers, leaf-miners and galling insects in the orders Lepidoptera, Diptera, Hymenoptera and Coleoptera (Schauff et al. 1997, Bouček 1988). Species of *Cirrospilus* are predominantly larval ectoparasitoids, but also have been documented both as hyperparasitoids on primary ichneumonoid parasitoids and as primary parasitoids on several life stages of the primary host (Bouček and Askew 1968). Over 300 nominal species of *Cirrospilus* occur worldwide, primarily in the Holarctic (Noyes 1998).

Species of *Cirrospilus* possess a two-segmented funicle, complete notauli that extend to the transscutal articulation (TSS) (Fig. 2), and the postmarginal vein is shorter than or equal in length to the stigmal vein (Schauff et al. 1997). However, the location of the axilla can vary within *Cirrospilus* from being almost entirely posteriad to slightly anterior of the TSS (LaSalle, personal communication). Further, as a member of Cirrospilini (Gauthier et al. 2000), *Cirrospilus* are characterized by a transverse sulcus on the face (Fig. 3)

and the posterior separation of the propleura. A closely related genus, *Zagrammosoma* Ashmead, has been separated from *Cirrospilus* on the basis of characters that intergrade between the two genera (Gordh 1978, LaSalle 1989, Gates 2000). For example, the placement of the axilla relative to the TSS cited by Yefremova (1996) appears useful in differentiating the two genera in some instances, but by no means all. For a discussion of generic character intergradation, see Gates (2000) and a summary in Table 1.

Acronyms used are: USNM = National Museum of Natural History, Smithsonian Institution, Washington, DC; DLWC = David Wagner collection, University of Connecticut, Storrs, CT.

Cirrospilus infuscatus
Gates and Schauff, new species
(Figs. 1–5)

Type material.—Holotype, ♀, "AZ: Cochise Co., Huachuca Mtns., Hunter Cyn 5100', 14-IV-1986 Wagner; DLW Lot: 86D70, em. 26-IV/10-V1986, Host: *Tischeria bifurcata*" (USNM). Paratypes, 3 ♀ 1 ♂, same data as holotype (1 ♀ 1 ♂ point-

Table 1. Character distribution in *Cirrospilus* and *Zagrammosoma*.

| Character | <i>Cirrospilus</i> | <i>Zagrammosoma</i> |
|-------------------------------------|-------------------------|----------------------------|
| Vertex vaulted | Rarely | Typical |
| Propodeum with strong median carina | Often | Rarely |
| Notaulus orientation | Extends straight to TSS | Curves to intercept axilla |
| Axilla shape | Triangular | Elongate |
| Axilla placement | Mostly posterior to TSS | Mostly anterior to TSS |

mounted, 1 ♀ slide/SEM stub mounted (USNM); 1 ♀ card mounted (DLWC).

Etymology.—This species is named for its infuscate wing pattern.

Diagnosis.—This species has the following unique features within *Cirrospilus*: petiolate gaster in both sexes with the petiole 1.4–1.7× as long as broad; an infuscate fore wing; strong, wide submedian lines on the scutellum; and the brachypterous male with the apex of the fore wing not extending beyond the basal ¼ of the gaster.

Description.—Female: Length 1.6–1.7 mm. Head and body deep golden, gaster dark brown laterally and with transverse bands dorsally, antenna dark brown. Legs golden, tarsi paler except apical tarsomeres brown. Wings hyaline except forewing infuscate in medial half (Fig. 5), venation brown.

Head: Finely reticulate with even coverage of fine brown setae. Roughly quadrate in frontal view, 1.0–1.1× as high as broad (Fig. 3). Malar space 0.4–0.5× eye height. Eye glabrous (minute setae apparent at high magnification) (Fig. 3). Scrobal depression shallow, unmarginated. Scape 4.6–5.5× as long as broad, two anelli transverse and short; pedicel 2.3–2.8× as long as broad; F1 1.3–1.6× as long as broad; F2 1.0–1.8× as long as broad; clava 2.0–2.4× as long as broad, 3-segmented, tapering apically (Fig. 4).

Mesosoma: Transversely reticulate anteriorly, becoming reticulate medially to glabrate posteriorly (Fig. 2). Midlobe of mesoscutum 1.1–1.2× as long as broad. Scutellum 1.0–1.1× as long as broad, with distinct submedial grooves most closely approaching each other anteriorly (Fig. 2);

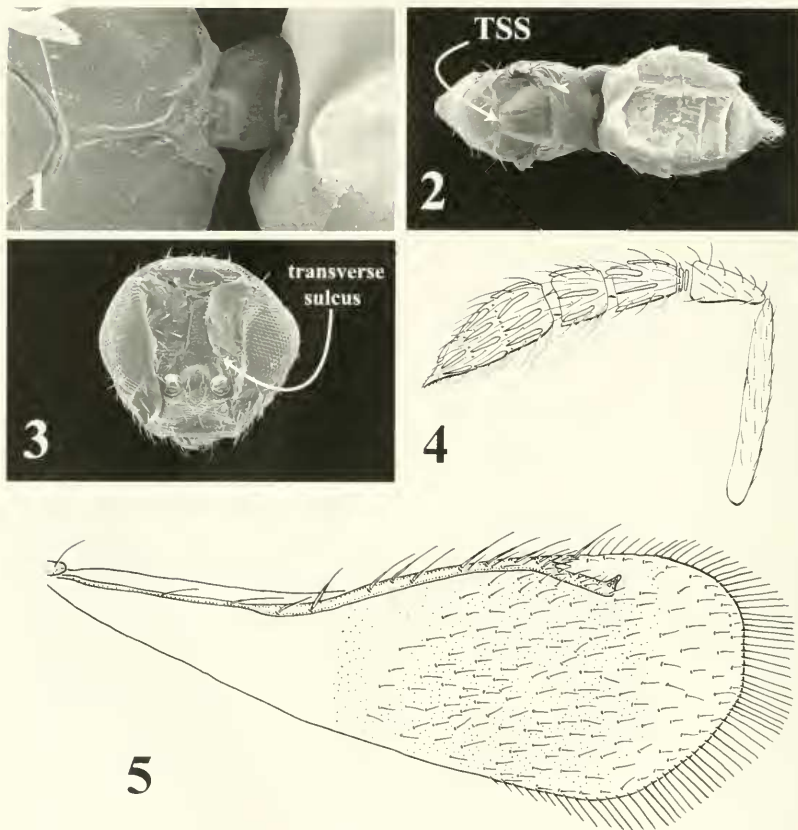
convex in lateral view. Mesopleuron glabrous to faintly reticulate. Propodeum glabrous with fine median carina; callus with row of at least 8 setae. Fore wing 2.5–3.1× as long as broad, setose in apical half (Fig. 5); marginal vein 8.0–10.0× as long as postmarginal vein; stigmal vein 3.3–3.5× as long as postmarginal vein.

Metasoma: Petiole 1.4–1.7× as long as broad, finely rugulose (Fig. 1). Gaster 1.1–1.2× as long as mesosoma. Tips of ovipositor sheaths visible in dorsal view (Fig. 2).

Male: Length 1.2 mm. Identical to female except as follows: malar space 0.6× eye height; scape 4.2× as long as broad; pedicel 1.8× as long as broad; F1 2.3× as long as broad; F2 1.2× as long as broad; clava 2.6× as long as broad; midlobe of mesoscutum 1.3× as long as broad; forewing brachypterous, 3.8× as long as broad; marginal vein 20× as long as postmarginal vein; stigmal vein 6.0× as long as postmarginal vein; petiole 1.4× as long as broad; gaster 0.9× as long as broad.

Variation.—The type series is essentially invariant.

Biology.—These specimens were reared from *Tischeria bifurcata* Braun (Lepidoptera: Tischeriidae) mining the leaves of *Ceanothus fendleri* A. Gray (Rhamnaceae) in the Huachuca Mountains of southeastern Arizona. A small proportion of total leaf mines collected were formed by a species of *Recurvaria* (Lepidoptera: Gelechiidae), but it is unlikely that these parasitoids emerged from those mines (Wagner, personal communication). Like other species of *Cirrospilus* (Gates 2000), *C. infuscatus* may be a gregarious parasitoid, as all specimens emerged on the same day. Unfortu-



Figs. 1-5. *Cirrosipilus infuscatus*, female. 1, Dorsal petiole. 2, Dorsal mesosoma and gaster; TSS = transscutal articulation. 3, Frontal head. 4, Antenna. 5, Fore wing.

nately, it is unknown if all specimens emerged from a single host insect. *Tischeria bifurcata* forms an irregular track on a single leaf with the mesophyll not completely consumed between epidermal layers. The frass is forced out of the lower epidermis and the pupa is also thrust through the lower epidermis (Wagner, field notes).

ACKNOWLEDGMENTS

We are grateful to David Wagner (University of Connecticut) for allowing access to his reared leaf miner materials where this species was discovered. Thanks also to John LaSalle (CSIRO, Canberra, Australia), John Heraty (University of California, Riverside, CA), Norm Woodley and Dave Smith (both USDA, Systematic Entomolo-

gy Laboratory, Washington, DC) for critical comments on earlier drafts of this manuscript.

LITERATURE CITED

- Bouček, Z. 1988. Australasian Chalcidoidea (Hymenoptera): A Biosystematic Revision of Genera of Fourteen Families, with Reclassification of Species. CABI, Wallingford, United Kingdom. 832 pp.
- Bouček, Z. and R. Askew. 1968. Palaearctic Eulophidae (excl. Tetrastichinae) (Hym. Chalcidoidea). Index of Entomophagous Insects. Le François, Paris. 260 pp.
- Gates, M. 2000. A new species of *Cirrospilus* Westwood (Hymenoptera: Eulophidae) from the southwestern United States and Mexico. Proceedings of the Entomological Society of Washington 102(1): 58-61.
- Gauthier, N., J. LaSalle, D. Quicke, and H. Godfray. 2000. Phylogeny of Eulophidae (Hymenoptera: Chalcidoidea), with a reclassification of Eulophinae and the recognition that Elasmidae are derived eulophids. Systematic Entomology 25: 521-539.
- Gordh, G. 1978. Taxonomic notes on *Zagrammosoma*, a key to the Nearctic species and descriptions of new species from California (Hymenoptera: Eulophidae). Proceedings of the Entomological Society of Washington 80: 344-359.
- LaSalle, J. 1989. Notes on the genus *Zagrammosoma* (Hymenoptera: Eulophidae) with description of a new species. Proceedings of the Entomological Society of Washington 91: 230-236.
- Noyes, J. 1998. Catalogue of the Chalcidoidea of the World. CD-ROM Expert Center for Taxonomic Information, Amsterdam, The Netherlands.
- Schauff, M., J. LaSalle, and L. Coote. 1997. Chapter 10. Eulophidae, pp. 327-429. In Gibson, G., J. Huber and J. Woolley, eds. Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera). NRC Research Press, Ottawa, Ontario, Canada.
- Yefremova, Z. 1996. Notes on some Palaearctic and Afrotropical species of the genus *Zagrammosoma* (Hymenoptera: Eulophidae). Zoologicheskii Zhurnal 74(10): 46-54.